

# Proposal for Preliminary Operation of Pump Station S-332D

## 1. Overview

This is a proposal to conduct preliminary, short-term, and focused operation of pump station S-332D located in the L-31W canal in south Miami-Dade County. The objective is to raise water levels in L-31W to meet or exceed the rainfall-driven target, and to allow canal water to overflow into the adjacent marsh.

Intensive monitoring of hydrologic and water quality parameters will be used to perform a preliminary assessment of the likelihood of the benefits of this operation, the need for related operational and structural changes elsewhere, and to serve as a basis for more detailed testing of S-332D in the future. Operational experience will be gained on the flexibility and limitations of this operation. The information obtained from the preliminary operation is a necessary first step in the development of more comprehensive testing of S-332D and wider-scale monitoring of its effects, with the eventual goal of implementing its operation as part of the C-111 and Modified Water Deliveries projects.

Construction of S-332D was completed in December 1997. The primary purpose for the pump station was to increase flows to Florida Bay via Taylor Slough. The South Florida Water Management District (District) applied for an operational permit to the Florida Department of Environmental Protection (FDEP), but a permit has not been obtained to date. An emergency authorization was issued in March of 1999 by FDEP to the U.S. Army Corps of Engineers (Corps), allowing it to operate the structure through August 15, 1999. The pump station has not been operated under this authorization to date.

This proposal temporarily affects the operations of structures in the L-31W canal without altering the operating criteria for structures along the L-31N or C-111 canals. Operations outside the L-31W will remain as specified in Test 7 Phase 1, which are the criteria presently being followed.

This proposal accompanies a request by the District to FDEP for a de minimis exemption to operate S-332D with the goals and objectives listed in the next sections. Pumping would take place over a four week period within a 10-week time span starting August 2, 1999. The four-week operation would coincide with rainfall conditions more favorable for pumping and would end no later than October 11, 1999. Alternatively, the District may elect to import water from outside the basin as needed to conduct this operation in the event that conditions are drier than normal.

## 2. Overall Goals

- a. Preliminary evaluation of hydrologic and water quality impacts upstream and downstream of S-332D
- b. Preliminary assessment of water levels and flow patterns associated with overflow of L-31W canal water into the adjacent marsh by one of two ways:
  - i. Rainfall Pumping: Pump S-332D to meet the L-31W rainfall-driven weekly target stage, causing canal water to rise and overflow into the marsh.
  - ii. Overflow Pumping: If the target stage is lower than necessary to achieve overbank flow, pump S-332D to induce canal water levels to rise a necessary amount beyond the target stage and overflow into the marsh for a week.
- c. Obtain field data to help formulate strategy for interim operation of S-332D before implementation of C-111 and Modified Water Deliveries
- d. Gather information to help design monitoring network for interim operation

## 3. Environmental Objectives for Preliminary Pumping

- a. Mimic more natural marsh water levels by following a rainfall-driven target stage in L-31W
- b. Mimic natural flow patterns from L-31W into the adjacent marsh by allowing water levels to rise and sheetflow into the marsh

## 4. Operational Objectives for Preliminary Pumping

- a. Follow Test 7 Phase 1 criteria for structures along L-31N and C-111 canals. Changes in these criteria are outside the scope of this proposal.
- b. Maintain Test 7 Phase 1 flood control capability in the C-111 basin.
- c. Divert as much flow as possible to L-31W
- d. Minimize use of S-174, S-332, and S-175
- e. At the end of the pumping period, the water level in L-31W, upstream of S-175, should provide the necessary L-31W gradient for full flood control capability at S-174
- f. Make operational changes in a gradual fashion, as much as possible

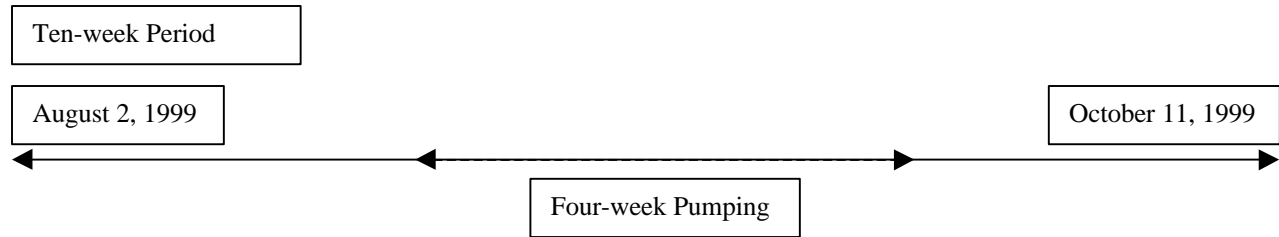
## 5. L-31W Rainfall-Driven Weekly Target Stage

Using the long-term average rain at Homestead Field Station as the projected rainfall for July through October of 1999, below are the projected rainfall-driven L-31W target water levels. The weekly targets are calculated based on a rainfall-stage relationship from 1970-1982 (used in Test 7) and 1930-1940 (proposed):

Week Ending	Projected L-31W Target Stage in feet	
	1930 - 40	1970 - 82
07/18/99	5.05	4.58
07/25/99	5.15	4.59
08/01/99	5.22	4.56
08/08/99	5.25	4.50
08/15/99	5.34	4.57
08/22/99	5.43	4.69
08/29/99	5.43	4.72
09/05/99	5.44	4.80
09/12/99	5.46	4.93
09/19/99	5.47	5.02
09/26/99	5.52	5.14
10/03/99	5.54	5.17
10/10/99	5.44	5.01
10/17/99	5.30	4.79
10/24/99	5.17	4.61
10/31/99	5.02	4.39

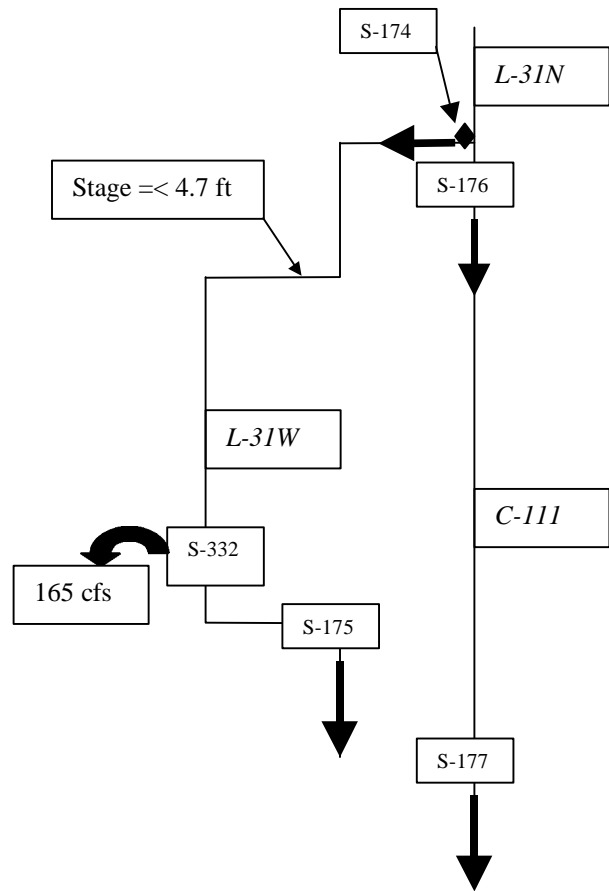
As shown in the table, the highest target stage would be 5.54 ft on 10/03/99 using the 1930-40 relationship. This would probably not be sufficient to achieve overbank flow. In that case, S-332D would be used to raise the L-31W canal water level beyond the target to achieve overbank flow for one week.

## 6. Schedule

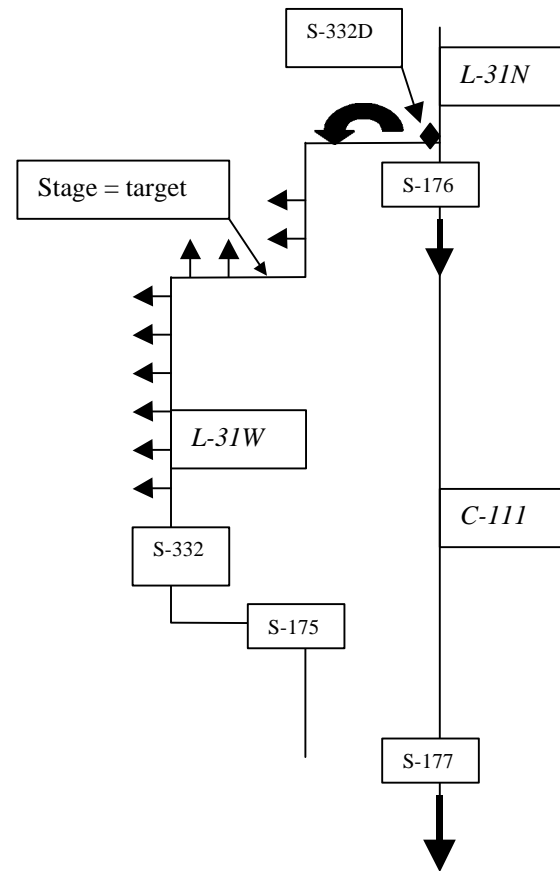


	Week 1 & 2	Week 3	Week 4
L-31W	Gradually switch operations to meet L-31W target stage <b>without</b> 4.7 ft cap	<b>Rainfall Pumping:</b> If L-31W target stage is above bank elevation, canal water would overflow the bank <b>Overflow Pumping:</b> If L-31W target stage is below bank elevation, gradually raise stage to cause overbank flow, then gradually return to target stage	Gradually switch operations to meet L-31W target stage <b>with</b> 4.7 ft cap. Return stage at S-175 to 4.5 ft to resume flood control capability at S-174
S-332D	0 - 500 cfs, as needed Pumping would be subject to availability of water in L-31N. Rain forecast would be considered. Pumping would be in conjunction with operation of S-176, to maximize diversion of flows to L-31W up to the amount specified, according to the L-31W target stages mentioned above		
Other Related Structures			
S-174	Closed to avoid water pumped through S-332D to discharge back to L-31N		
S-176	Discharge in conjunction with S-332D as necessary to divert L-31N flows		
S-332	Turned off to allow water levels in L-31W to rise and possibly overflow into marsh		
S-175	Closed to allow water levels in L-31W to rise and possibly overflow into marsh		

## 7. Example of Operations Before and During Preliminary Pumping



Flows prior to preliminary pumping



Flows during proposed week 3 of preliminary pumping

## 8. Monitoring of Preliminary Pumping

### a. Hydrologic Monitoring

Area of interest	Parameter	Gage	Frequency	Purpose of Monitoring
Rocky Glades marsh immediately upstream of S-332D	Well Water Level	CR1	Daily	Effects on upstream marsh water levels
Agricultural area immediately upstream of S-332D	Well Water Level	G-789	Daily	Effects on upstream agricultural water table
Taylor Slough marsh immediately west and southwest of L-31W	Well Water Level	E112	Hourly, Daily	Effects of overbank flow on downstream marsh water level
	Well Water Level	R3110	Hourly, Daily	Effects of overbank flow on downstream marsh further west
	Channel Flow	Computation based on stage gage and discharge relationship at Taylor Slough Bridge	Daily	Effects of overbank flow on Taylor Slough flow
Downstream agricultural area	Well Water Level	Robblee	Hourly (available next day), Daily	Effects of S-176 change and Frog Pond seepage to east of C-111
	Well Water Level	Frog Pond	Daily	Effects of higher L-31W stage to eastern Frog Pond
Aerojet canal area	Well Water Level	EVER4	Daily	Effects of possible S-175 operation
L-31N canal	Canal Water Level	S-176 HW	Breakpoint, Daily	Effect of pump drawdown immediately upstream
	Canal Water Level	Short-term monitoring one mile upstream of S-176. <b>Temporarily installed specifically for this proposal.</b>	Breakpoint, daily	Effect of pump drawdown further upstream

<b>Area of interest</b>	<b>Parameter</b>	<b>Gage</b>	<b>Frequency</b>	<b>Purpose of Monitoring</b>
	Structure Flow	S-176 gate	Breakpoint, Daily	Proportion of flow diverted to L-31W
L-31W canal	Canal Water Level	S-174 TW and S-332 HW	Breakpoint, Daily	Effect of pump discharge in L-31W water level gradient
	Structure Flow	S-332D pumps, S-332 pumps, and S-175 culverts	Breakpoint, Daily	Proportionn of flow diverted to L-31W, volume of water diverted
	Seepage	Two L-31W ultrasonic velocity meters in place	Hourly, Daily	Assess seepage into and out of L-31W canal
	Sheetflow pattern	Aerial photography, ground observation	Daily during overflow	Assess distribution of overbank flow along L-31W bank

b. Water Quality Monitoring

All sampling at structures is done upstream.

**Begin as of 7/19/99:**

Bi-weekly sampling at S176 regardless of flow

**Friday July 30, 1999:**

**Grab sample from 4 sites-** S176/S174/S332D; S332; S331; and S175

**Frequency:** once

**Parameters** - nutrients (TP, OP, TKN, NO<sub>x</sub>, NO<sub>2</sub>, NH<sub>4</sub>);  
TSS  
Turbidity  
Lab conductivity  
Pesticides (normal suite)

**Hydrolab** - temporarily deploy hydrolabs at S176 and S332 for continuous monitoring of physical parameters during the proposed operation

**Beginning 8/2/99:**

**Week 1:**

**Grab samples** at S176, S331, S332 and S175

**Frequency:** Daily

**Parameters** - nutrients (TP, OP, TKN, NO<sub>x</sub>, NO<sub>2</sub>, NH<sub>4</sub>);  
TSS  
Turbidity  
Lab conductivity  
Pesticides (normal suite)

**Hydrolab** - temporarily deploy hydrolabs at S176 and S332 for continuous monitoring of physical parameters during the proposed operation

**Week 2 thru 4**

**Grab samples** at S176, S331, S332 and S175

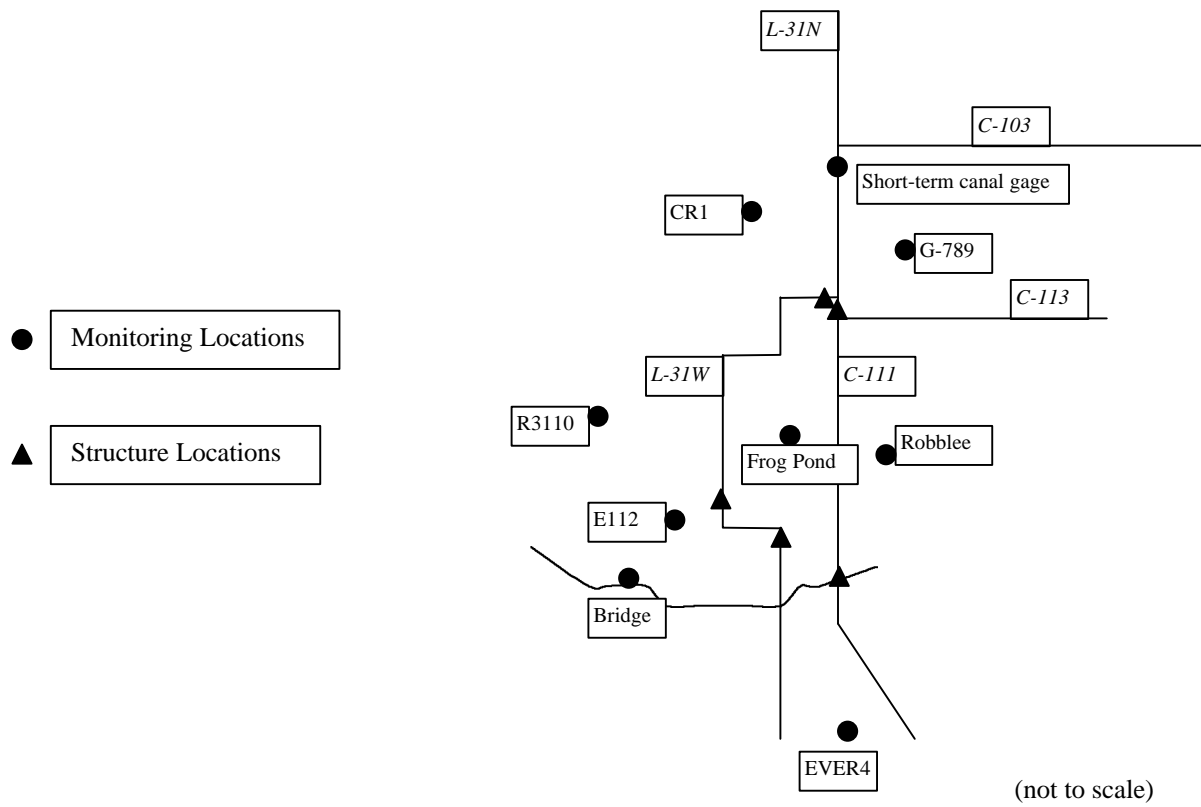
**Frequency:** twice a week

**Parameters** - nutrients (TP, OP, TKN, NO<sub>x</sub>, NO<sub>2</sub>, NH<sub>4</sub>);  
TSS  
Turbidity  
Lab conductivity  
Pesticides (normal suite)

**Hydrolab** - temporarily deploy hydrolabs at S176 and S332 for continuous monitoring of physical parameters during the proposed operation



c. Map of Monitoring Sites



## 9. Summary of Data

### a. Hydrologic Reporting

Measure Produced	Data Used	Information Obtained
Groundwater impacts on Rocky Glades upstream	S-332D upstream level and CR1 water level	Upstream impacts
Groundwater impact agricultural area upstream	S-332D upstream level and G-789 water level	Upstream impacts
Groundwater impact on Taylor Slough marsh downstream	S-332D and NTS1	Downstream impacts
Diversion of Flow at intersection of L-31N and L-31W	Flow at S-332D and S-176	Operational strategy
Map of overbank flow locations	Aerial photos, field observations	Potential degrade of berm/bank
Flow at Taylor Slough bridge	TSB flow and S-332D flow	Flow toward Florida Bay

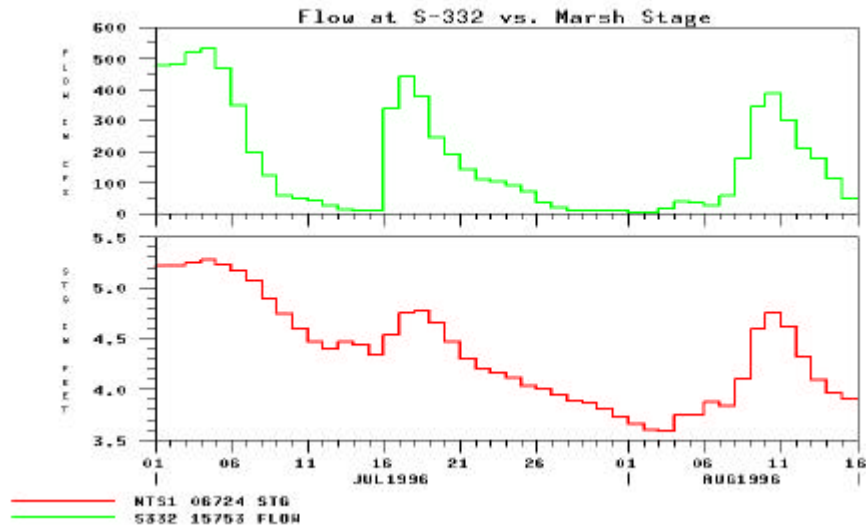
### b. Water Quality Reporting

- i. A narrative on the augmented sampling frequency, site locations, and parameters collected during the pump test
- ii. Water Quality Data Evaluation and Analysis for pump test data. This will include:
  - (1) Summary of Physical Parameters, Nutrients, Major Ions, Trace Metals:
    - (a) Providing Basic Summary Statistics of all the parameters collected during the Test
    - (b) Each parameter (with a numeric criteria) will be compared with applicable Class III Water Quality criteria as stated in Section 62-302.530, F.A.C.
    - (c) The data for any parameters showing any excursions will be plotted in time series plots.
    - (d) Time series plots of Total Phosphorus and Total Nitrogen will be provided
    - (e) A narrative on what was observed with the data
  - (2) Summary of Pesticides Data:
    - (a) A narrative on the occurrence and related frequency of any detectable concentrations of pesticides
  - (3) WQ Monitoring Data Tables
    - (a) Present the data from the wq collected during the pump test in tables for each site
- iii. A narrative relating the data collected during the pump test to the historical data collected from these sites

Data will be collected, processed, and summarized in a short report. The data summary report will be provided to DEP **one month** after all data described in the previous section has

been collected and processed. The summary report will be available to all interested parties upon request.

An example of a plot of possible water level and discharge relationships is presented below using 1996 data for S-332 flow and adjacent marsh water level at the NTS1 gage:



#### 10. Triggers for Terminating, Suspending, and Resuming Preliminary Pumping

The preliminary pumping would be **terminated** on October 11, 1999 or at the end of the four-week pumping period, whichever is earlier.

The preliminary pumping would be temporarily **suspended**, when in the judgement of water managers, it is necessary to do so to effectively deal with flood control conditions.

The preliminary pumping would **resume** when the conditions for suspending it no longer exist. Depending on operational conditions, pumping would resume or restart at Week 1, 2, or 3 of the schedule.